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ABSTRACT

The Double ABCX Model of Family Adjustment and Adaptation, a model that predicts adaptation to chronic stressors on the family, was extended by dividing it into attitudes, coping, and adaptation of parents and child separately, and by including variables relevant to child adaptation to epilepsy or asthma. The extended model was tested on 246 children (126 with epilepsy and 120 with asthma, ages 8-14), using data gathered in interviews and questionnaires involving the children, their mothers, and their school teachers. Structural equation modeling was carried out to test the model's relationships. Coping and adaptation measures were treated as endogenous variables and family adaptive resources, demographics, family demands, attitudes, health condition, and school status measures were treated as exogenous variables. Moderate support was found for the variables proposed in the extended Double ABCX Model child adaptation to epilepsy or asthma. Child coping patterns were the strongest predictors of child adaptation at home and at school, and child's attitude was the strongest predictor of child self-concept. However, parental coping, demographic, and health condition variables accounted for essentially no variance in child adaptation. The model to predict child adaptation to epilepsy was more complex than the model for asthma in that more exogenous variables were retained. (14 references.) (JDD)

Childhood Epilepsy and Asthma: A Test of an Extension of the Double ABCX Model

by

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The Double ABCX Model of Family Adjustment and Adaptation (McCubbin & Patterson, 1983) is a model that predicts adaptation to chronic stressors on the family. Major concepts in the model are family demands (ie., stressors), family adaptive resources, family attitudes, family coping, and family adaptation. The two major relationships predicted in the model are: (a) family demands, family adaptive resources and family attitudes predict family coping; and (b) family coping predicts family adaptation. The Double ABCX Model is a very general one and does not specify how a particular family member would be affected or how other variables such as demographic or illness variables would affect adaptation. Therefore, the Double ABCX Model was extended to be able to predict child adaptation to a chronic health condition. The model was extended first by dividing family attitudes, coping and adaptation into parent and child attitudes, coping, and adaptation, respectively. Second, the model was expanded to include variables that would be relevant to child adaptation to epilepsy or asthma (e.g., demographic, health condition, and school status). See Figure 1 for the proposed extension of the Double ABCX Model.

The extended model was then tested on 246 children (126 with epilepsy and 120 with asthma). Children were ages 8 through 12 years. All had had their health conditions for at least 1 year, had no other chronic health conditions, and had IQ's of 70 or above. Data were collected from the children, their mothers and their school teachers. Results were compared with the proposed

extended model. In addition, differences between the two samples were contrasted.

Instruments

Data were collected using interviews and questionnaires. The instruments used to operationalize the concepts in the extended version of the Double ABCX Model were: Family Demands: Family Inventory of Life Events and Changes (FILE) (McCubbin & Thompson, 1987); Family Adaptive Resources: Family Inventory for Resources for Management (FIRM) (McCubbin & Thompson, 1987); Parent Attitude: Parental Attitude Toward (Epilepsy-Asthma) in my Child (Attitudes were measured using the Fishbein Expectancy-Value Model [Austin, McBride, & Davis, 1984] and a semantic differential scale developed for this research); Child attitude: Child attitude Toward Illness Scale (Austin, 1988); Parent Coping: Coping Health Inventory for Parents (CHIP) (McCubbin & Thompson, 1987); Child Coping: Coping Health Inventory for Children (CHIC) (Austin, Patterson, & Huberty, in press); Family Adaptation: Family APGAR for parents (Smilkstein 1978) and Family APGAR for children (Austin & Huberty, 1989); Child Adaptation: Child Behavior Checklist (Achenbach & Edelbrock, 1983), Child Behavior Checklist Teacher's Report Form (Achenbach & Edelbrock, 1986), and Piers-Harris Self-Concept Scale (Piers-Harris Children's Self-Concept Scale). Socioeconomic status was measured using a formula by Green (1970). Episodes of seizures or asthma attacks were measured on an 8-point scale as follows: (1) no episodes for 1 year or more, (2) no episodes for 6 months

to 1 year, (3) no episodes for 3 months to 6 months, (4) no episodes for 1 month to 3 months, (5) 1-9 episodes in the past month, (6) 10-19 episodes in the past month, (7) 20-29 episodes in the past month, and (8) 30 or more episodes in the past month. Variables for each of the concepts in the model that were included in the testing of the model are presented in Table 1.

Data Analyses

Structural equation modeling was carried out to test the relationships proposed in the extended version of the Double ABCX Model using the LISREL VI computer program (Joreskog & Sorbom, 1984). Coping and adaptation measures were treated as endogenous variables and family adaptive resources, demographic, family demands, attitude, health condition and school status measures were treated as exogenous variables.

An initial model for both epilepsy and asthma groups was hypothesized and estimated. Because the purpose of the modeling is to understand better the complex interactions of a variety of factors, these initial models were enhanced by use of the automatic modification feature of LISREL (Joreskog & Sorbom, 1984, II.22) to produce final models with more satisfactory statistical properties. In this process, certain parameters were never freed because of the theoretical structure of the model. As the resultant models were different in some aspects, a multi-group analysis was conducted within LISREL (Joreskog & Sorbom, 1984, Chapter V) in order to test the statistical significance of the difference. Within this context, the goodness-of-fit

difference for the restricted versus the unrestricted models was 56 and the degree of freedom difference was 27. This result is significant at the .01 level in a Chi-Square distribution with 27 degrees of freedom and confirmed an initial hypothesis that the extended Double ABCX Model would apply differently to the two disease groups. As a consequence, subsequent interpretation of the data analyses focused on separate models for epilepsy and asthma. Variables that were dropped from both models because of a lack of any significant paths with another variable are identified with an asterisk in Table 1.

Results

Figures 2 and 3 display the significant paths (alpha = 0.05) in the models for the two groups. Dark lines represent the most important path (as judged by standardized path coefficients) for the endogenous variable. Curved broken lines indicate that error terms are significantly correlated in the path equations for the connected pair of endogenous variables. Results for each group are followed with a comparison of the models.

Epilepsy. The final model representing the best fit of the data for the epilepsy sample is presented in Figure 2. The model was found to have a strong fit to the data. The chi-square measure of goodness-of-fit was 60.5 with 52 degrees of freedom was not statistically significant ($p < .205$). In addition, the goodness-of-fit index (GFI), a measure of the relative amount of variance and covariance accounted for, was .927. A final indicator of a good fit of the model to the data was the finding

that only two of the normalized residuals had a magnitude greater than 2.0.

Table 2 contains the squared multiple correlations for each endogenous variable indicating the amount of variance accounted for through direct and indirect relationships in the model. The mother's rating of family adaptation had the largest amount of variance accounted for at .63. The next largest was .51 for child adaptation at home. The lowest amount of variance accounted for was for the child's rating of family adaptation at .08.

Family demands, which reflects the total number of stressors on the family, was the major predictor of both child coping patterns of develops competence and is irritable. The child coping pattern, is irritable, was the strongest predictor of child adaptation both at home and at school. The strongest predictor of child self-concept was the child's attitude toward having epilepsy and the strongest predictor of the mother's rating of the family adaptation was the family adaptive resource of mastery and health. Mastery and health reflects the amount of control the family perceives over events in the life of the family.

In general, results support that the extended Double ABCX model accounts for a relatively large amount of variance in the prediction of child adaptation to epilepsy and is a good model on which to build in future research. In addition, the family environment, especially stress and strain on the family, was

found to influence child coping patterns directly and child adaptation at home and at school indirectly. Increased demands on the family was found to lead to increased irritability and increased behavior problems both at home and at school in the child. Results indicate that family demands and child coping variables are stronger predictors of child adaptation than health condition variables.

A comparison between the extended Double ABCX Model in Figure 1 and the model found for the epilepsy sample in Figure 2 reveals differences. One difference is the absence of all parent coping, health condition and school status variables because of lack of significant relationships with any other variables in the model. With few exceptions, family adaptive resources and attitudes were found to be directly related to adaptation measures rather than indirectly through coping as proposed in the Double ABCX Model. A final difference involves the relatively weak relationships between family and child adaptation.

Asthma

The final model representing the best fit to the data from the asthma sample is presented in Figure 3. The chi-square measure of goodness-of-fit of the model was 85.09 with 56 degrees of freedom ($p < .007$). Even though the chi-square was statistically significant, the relative likelihood ratio (RLR), a measure of the ratio of the chi-square value to its degrees of freedom, was less than 2:1 indicating a good fit (Boyd, Frey, & Aaronson, 1988). The GFI was also strong at .91 and only three

normalized residuals were greater than 2.0. All of these indicators suggest that the model developed for the asthma sample is a good fit with the data.

The major predictors of child coping behaviors were the two family adaptive resource measures of esteem and communication, and mastery and health. The two child coping patterns of is irritable and withdraws were the strongest predictors of the child's adaptation at home and at school respectively. The child's attitude toward having asthma and the child's rating of family adaptation were the strongest predictors of child self-concept. Demographic, health condition, and school status variables were not found to be adequate predictors of child coping and adaptation. Results support that the family environment, especially adaptive resources, influence child coping and adaptation. The adaptive resource of mastery and health, which reflects the amount of control the family perceives over family events, was also found to directly influence the adaptation of the child at home.

Squared multiple correlations (see Table 2) indicated that the amount of variance accounted for was the largest for child adaptation at home (.61) and child self-concept (.43). The lowest amount of variance accounted for was for the child's rating of family adaptation at .10 and child adaptation at school at .11. The relatively large amount of variance accounted for in these two child adaptation measures supports the use of the extended Double ABCX Model in the prediction of child adaptation

to a chronic health problem.

A comparison of the model for asthma in Figure 3 with the proposed extended Double ABCX Model in Figure 1 indicated differences. A major difference was the loss of family demands, a principal concept in the Double ABCX model. In addition, no demographic, health condition or school variables had significant relationships with any other variables and were deleted from the final model. Only one of the parental coping measures, family maintenance, was retained; however, it had no direct or indirect relationship with any of the child coping or adaptation variables. In contrast to that predicted by the proposed model, the family adaptive resource of mastery and health and child attitude had direct relationships with child adaptation rather than being mediated through coping. In addition, there was a relatively weak relationship between family adaptation and child adaptation.

Epilepsy and Asthma Comparison

In general, the model predicting child adaptation to epilepsy was a more complex model than the one predicting child adaptation to asthma in that more exogenous variables were retained. Socioeconomic status, child's age and family demands were included as exogenous variables only in the model for epilepsy. Family demands, which reflects the pile-up of stress and strain on the family, appeared to have a strong negative impact on the coping strategies used by the child with epilepsy and subsequently a negative impact on child adaptation at home

and at school. In addition, children with epilepsy were found to be less influenced by the family adaptive resources than the children with asthma. These results suggest that children with epilepsy may be more vulnerable to the accumulation of stressors and strains on the family than children with asthma. Previous research on these samples indicated that children with epilepsy had significantly poorer self-concepts than children with asthma (Austin, 1989). It may be that the poorer self-concepts contribute to increased vulnerability found in the children with epilepsy.

Examination of the squared multiple correlations displayed in Table 2 indicate that even though child adaptation at home was relatively well explained by both models less variance was accounted for in the coping variables, especially for epilepsy. This lack of explanation of the child coping variables suggests that other variables that were not included in the model account for a large amount of the variance in child coping. These results indicate that especially the model predicting child adaptation to epilepsy could be enhanced by including additional variables as predictors of child coping.

The child's attitude toward having the health condition was an important variable in the prediction of child self-concept in both models indicating that how the child feels about having the health condition is strongly related to how the child feels about him or herself. Because a positive self-concept is important to the development of strong mental health, it would be important to

better understand those factors that influence children's attitudes. In the current causal modeling analysis attitude variables were not treated as dependent variables so it is not known which variables influenced the child's attitude toward having the health condition. In subsequent research, child's attitude toward the health condition should be considered a dependent variable in order to identify those factors that influence children's attitudes toward their chronic health problems and subsequently their self-concepts.

The child's satisfaction with family relationships or family adaptation was also an important predictor of child self-concept in both models. Squared multiple correlations indicated, however, that variables in both models explained very little of the variance accounting for the child's rating of family adaptation. Results suggest that variables in the model are not adequate to explain the child's rating of family adaptation and additional variables should be included.

Conclusion. Moderate support was found for the variables proposed in the extended Double ABCX Model to predict child adaptation to epilepsy or asthma. The major exceptions were that parental coping, demographic, and health condition variables accounted for essentially no variance in child adaptation in the models. Nevertheless, variables retained in the models accounted for a major portion of child adaptation to both epilepsy and asthma and indicate that the extended model is a good one on which to build future models of child adaptation to a chronic

condition.

In general, the model to predict child adaptation to epilepsy was more complex in that more exogenous variables were retained. In addition, the low amount of variance accounted for in the coping variables for epilepsy suggest that even more exogenous variable should be added to the model. Another major difference between the two models was the finding that family demands or stress on the family, which was the strongest predictor of child coping patterns in the model for epilepsy, was deleted from the model for asthma. Major similarities included the findings that child coping patterns were the strongest predictors of child adaptation at home and at school and child's attitude was the strongest predictor of child self-concept for both models.

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TABLE 1
VARIABLES in the MODEL

Family Adaptive Resources
- Esteem and Communication
- Mastery and Health
- *Extended Family Social Support
- *Financial Well-Being

Demographic Variables
- Socioeconomic Status
- Child Age
- *Child Gender
- *Marital Status

Family Demands

Parent's Attitude
- Mother's Attitude (Affective)
- Mother's Attitude (Cognitive)

Child's Attitude

Health Condition
- *Seizure Frequency
- *Asthma Frequency

School Status
- *Repeated a Grade at School

Parent Coping
- Family Maintenance
- *Uses Social Support
- *Uses Medical Consultation

Child Coping
- Develops Competence
- Is Irritable
- Withdraws
- *Seeks Support
- *Complies with Treatment

Family Adaptation
- Mother's Rating of Satisfaction with Family Relationships
- Child's Rating of Satisfaction with Family Relationships

Child Adaptation
- Home Behavior Problems
- School Behavior Problems
- Self-Concept

*Dropped from both Models because of lack of significant paths.

TABLE 2
SQUARED MULTIPLE CORRELATIONS for ENDOGENOUS VARIABLES

	Epilepsy	Asthma
Family Maintenance Mother Coping	----	.36
Develops Competence Child Coping	.17	.38
Withdraws Child Coping	----	.38
Is Irritable Child Coping	.15	.33
Family Adaptation Mother's Rating	.63	.32
Family Adaptation Child's Rating	.08	.10
Child Adaptation Home Behavior Problems	.51	.61
Child Adaptation School Behavior Problems	.33	.11
Child Adaptation Self-Concept	.27	.43

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11/28/90
tables2

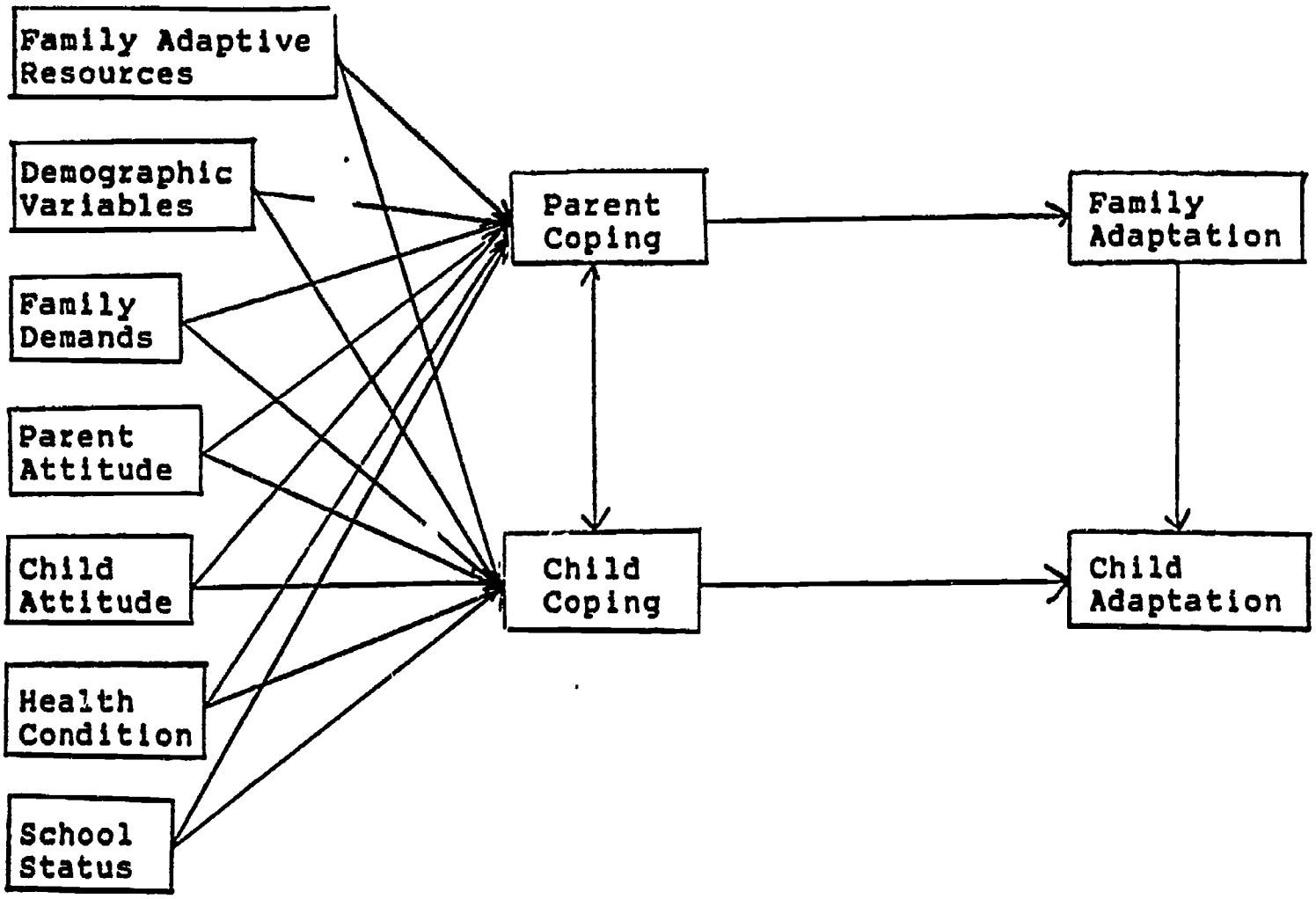

Figure 1: Extension of the Double ABCX Model to Predict Child Adaptation to a Chronic Health Condition

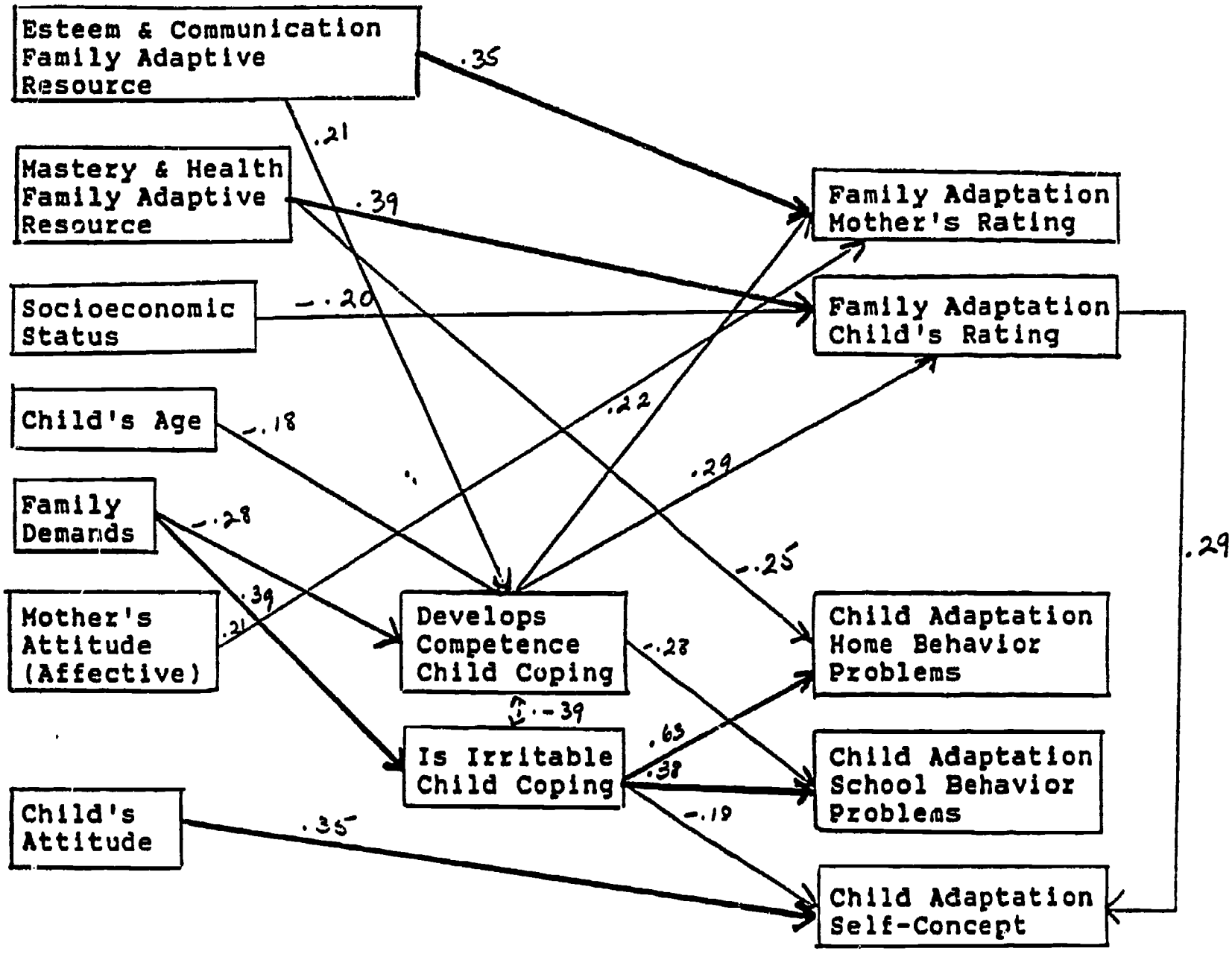

Figure 2: Standardized Path Coefficients for Epilepsy Sample. All Paths are significant ($p < .05$).

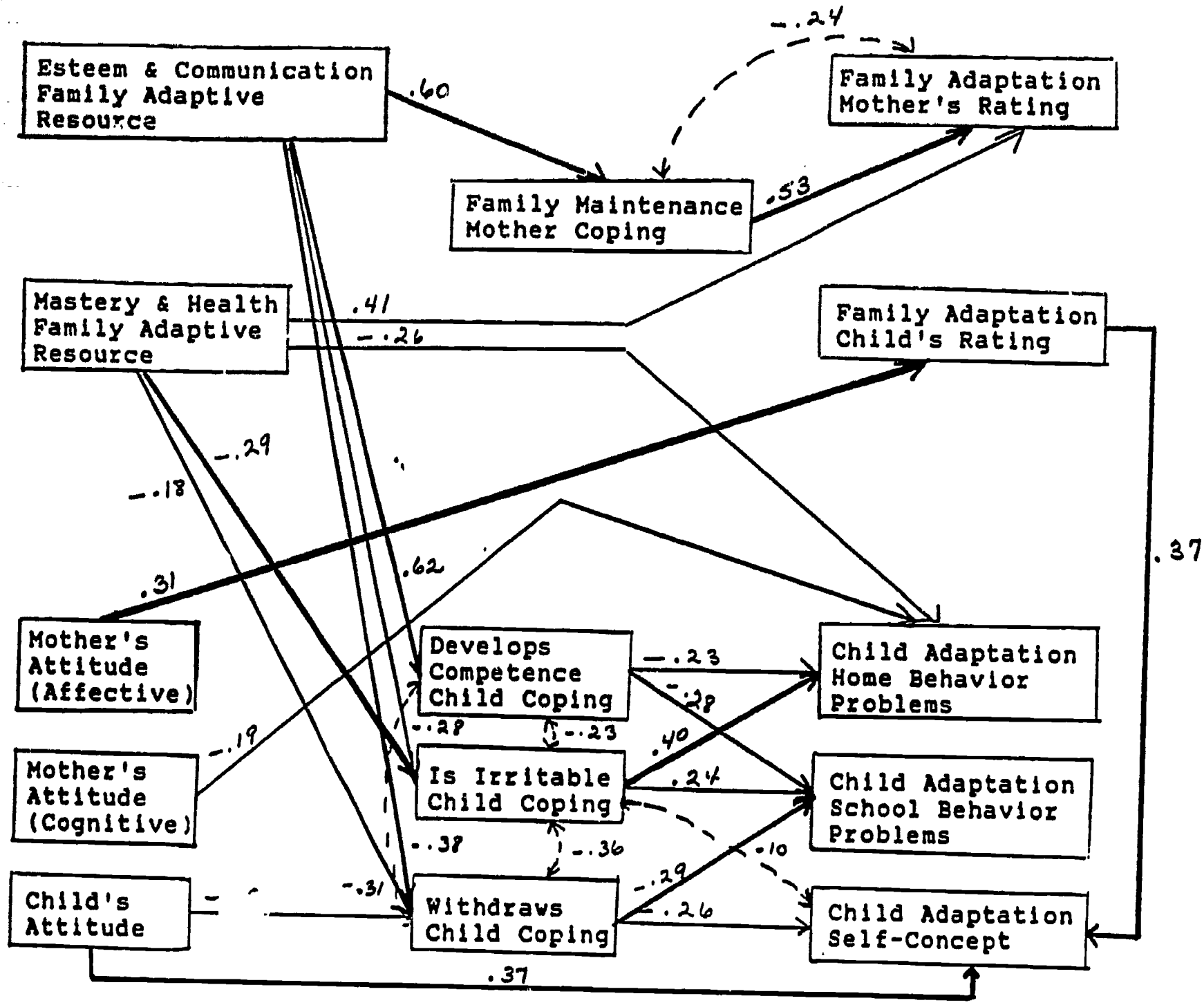

Figure 3: Standardized Path Coefficients for Asthma Sample. All Paths are Significant ($p < .05$).